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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,880	10/30/2006	Stefan Schafer	SCHAFER, S.ET AL. - 3 PCT	5621

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COLLARD & ROE, P.C.
1077 NORTHERN BOULEVARD
ROSLYN, NY 11576

EXAMINER	
ANDERSON, DENISE R	
ART UNIT	PAPER NUMBER
1797	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,880	SCHAFER ET AL.	
	Examiner	Art Unit	
	Denise R. Anderson	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-19* is/are rejected.

7)☐ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *29 September 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because the drawings are in German and need to be translated to English. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 15 is objected to because of the following informality: Claim 15 recites that "within the aeration cycle, all of the membrane modules are aerated . . . at the same time . . . from opening of all control valves." Claim 15 depends on claim 11 and claim 11 recites that

there is no point where all of the control valves are open since "all of the membrane modules are aerated in accordance with the three method steps, one after the other, until the aeration cycle starts anew with the first membrane module." The one exception where claim 11 and claim 15 are logically consistent is if the number of control valves is two. Applicant needs to amend claim 15 to clarify what is being claimed. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Regarding claim 14, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the

decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

6. In the present instance, claim 14 recites the broad recitation of an aeration cycle of "more than 60 seconds", and the claim also recites an aeration cycle of "more than 120 seconds" which is the narrower statement of the range/limitation.

7. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17 is shown below:

> *Claim 17 (new). Method according to claim 11, wherein of the membrane modules are aerated simultaneously, by means of opening the assigned control valves, between the aeration cycles.*

Are "all of," "some of," or "none of" the membrane modules aerated simultaneously between the aeration cycles? Since this is unknown, claim 17 is rejected as being indefinite and no further examination was done in the patentability analysis below.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 11-16, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Rabie et al. (U.S. Patent Pub. No. 2003/0127389 A1, Jul. 10, 2003).

10. Regarding claim 1, Rabie et al. discloses, "[A] cyclic aeration system that may be used for aerating ultrafiltration and microfiltration membranes modules immersed in tank water in a tank." Rabie et al., ¶ 9, lines 1-4. Rabie et al. further teaches, "Air bubbles are introduced to the tank through aerators mounted below the membrane modules and connected by conduits to an air blower." Rabie et al., ¶ 4, lines 1-3. In other words, Rabie et al. discloses method for aerating multiple membrane modules submerged in a tank where the air is supplied to the outside of the membrane modules from a common source, an air blower, as recited.

11. In Figures 1-8, Rabie et al. discloses that valves are disposed in the air lines and activated according to a predetermined circuit schematic, as recited, when Rabie et al. states, "The cyclic aeration system uses a valve set (Fig. 2, 254) and a valve set controller (Fig. 2, 256) to connect an air supply (Fig. 2, 242) to a plurality of distinct branches (Fig. 2, air delivery branches 240) of an air delivery network (Fig. 2). The distinct branches of the air delivery network are in turn connected to aerators (Fig. 2, 238) located below the membrane modules. While the air supply is operated to supply a steady initial flow of air, the valve set and valve set controller split and distribute the initial air flow between the distinct branches of the air distribution system such that the air flow to each distinct branch alternates between a higher flow rate and a lower flow rate in repeated cycles (applicant's predetermined circuit schematic which Rabie et al. shows in Fig. 3)." Rabie et al., ¶ 9, lines 4-14. In Figures 2 and 3, Rabie et al. further teaches that the valves assume either an open or closed position to release or block the air supply to their respective membrane module.

12. In Figure 4F, Rabie et al. discloses that the cyclic aeration system has the three recited method steps of:

First method step: The first control valve (second branch) is open and the second control valve (first branch) is closed at time 0 and time 14-20 seconds.

Second method step: Both the first control valve and the second control valve are open at time 0-3 seconds and time 10-13 seconds.

Third method step: The first control valve (second branch) is closed and the second control valve (first branch) is open at time 3-10 seconds.

In Figures 2 and 3, Rabie et al. discloses the valve set 254 with three valves where each membrane module is aerated in accordance with the three method steps, one after another, until the aeration cycle starts anew with the first membrane module, as recited.

13. In summary, Rabie et al. anticipates claim 11.

14. Regarding claims 12 and 13, Rabie et al. discloses these limitations in Figures 2 and 3 and at ¶ 48. Specifically, in Figures 2 and 3, Rabie et al. teaches that when the valves are open, the membrane modules experience high air flow rates R_h and, when the valves are closed, the membrane modules experience low air flow rates R_l. Regarding these high and low air flow rates, Rabie et al. discloses, "R_l is typically less than one half of R_h and is often an air off condition with no flow. Within this range, the lower rate of air flow is influenced by the quality of the feed water 14. An air off condition is generally preferred, but with some feed water 14, the hollow fibre membranes 23 foul significantly even within a short period of aeration at the

lower rate. In these cases, better results are obtained when the lower rate of air flow approaches one half of the higher rate. For feed waters in which the rate of fouling is not significant enough to require a positive lower rate of air flow, Rl may still be made positive for other reasons." Rabie et al., ¶ 48, lines 1-11. For example, Rabie et al. continues, "A positive lower rate of air flow may also be used because of leaks on the valves of the valve set 254 or to reduce stresses on the valve set 254 or the air delivery network 240. Regarding leaks, the lower rate of air flow may typically be as much as about 10%, but preferably about 5% or less, of the higher rate of air flow without significantly detracting from the performance achieved with a completely air off condition. Continuing to use valves (which are typically butterfly valves) even after they have developed small leaks decreases the operating expense of the cyclic aeration system 237. Regarding stresses on the valves in the valve set 254 or the air delivery network 240, such stresses can be reduced by purposely not closing the valves entirely. As in the cases of leaks, the lower rate of air flow may be as much as about 10%, but preferably about 5% or less, of the higher rate of air flow typically without significantly detracting from the performance achieved with a completely air off condition." Rabie et al., ¶ 48, lines 17-22.

15. In summary, Rabie et al. anticipates claims 12 and 13.

16. Claim 14 was rejected as indefinite because it recited a broad range (more than 60 seconds) and a narrow range (more than 120 seconds) for the duration of an aeration cycle. In either case, Rabie et al. discloses, "In one such embodiment, the cyclic aeration system is configured and operated to provide air to a branch of the air delivery network alternating between a higher flow rate and a lower flow rate in cycles of 120 seconds or less." Rabie et al., ¶ 11, lines 9-13.

17. Claim 15 was objected to above and in that objection, it was noted that the number of valves being recited is two. In Figure 4F, Rabie et al. discloses two control valves undergoing cyclic aeration as recited.

18. Regarding claim 16, Rabie et al. discloses the recited limitations in Figures 2 and 3 where the air flow is split into three air delivery branches 240 and each air delivery branch is split into eight conduit aerators 238. As such, there are three "different groups of at least three membrane modules" as recited in claim 16.

19. Claim 17 was rejected above as too indefinite to examine any further.

20. Regarding claims 18 and 19, Rabie et al. discloses these limitations of one or more membrane groups being provided air flow between the aeration cycles [claim 18] where the time between aeration cycles is at least as long as the time during aeration cycles [claim 19]. The specific context is that permeation times (applicant's time between aeration cycles with low air flow rates to all membrane modules) is interspersed with backwash time where the aeration cycle (applicant's aeration cycle as described in claim 1) is timed to coincide with the backwash cycle as each set of membranes is backwashed in turn.

21. Specifically, Rabie et al. refers to Figure 5 and teaches the "Use of Cyclic Aeration to Provide Efficient Intermittent Aeration." Rabie et al., ¶ 71. Rabie et al. further teaches, "Use of the cyclic aeration system 237 to provide efficient intermittent aeration will now be described with reference to the following embodiment, it being understood that the invention is not limited to the embodiment. Referring to FIG. 5, an aeration system 237 is shown for use in providing intermittent aeration to six membrane modules 20 (shown with dashed lines) in a filtration tank

412. The filtration tank 412 has six filtration zones (also shown with dashed lines) corresponding to the six membrane modules 20." Rabie et al., ¶ 72, lines 1-10.

22. Rabie et al. discloses, "The air delivery network 240 has six distinct branches each connected to a header 251 in a filtration zone. Each header 251 is in turn connected to conduit aerators 238 mounted generally below the membrane modules 20. The valve set 254 and valve controller 256 are configured and operated to provide air from the air supply 242 to the air delivery network 240 in a 7.5 minute cycle in which air at the higher rate is supplied for about 75 seconds to each branch of the air delivery network 240 in turn. While a branch of the air delivery network 240 is not receiving air at the higher rate, it receives air at the lower rate. Accordingly, each header 251 receives air at the higher rate for 75 seconds out of every 7.5 minutes. Operation of the air supply 242, however, is constant and an air supply sized for one manifold 251 is used to service six such manifolds." Rabie et al., ¶ 73.

23. Regarding timing aeration with backwashing, Rabie et al. discloses, "It is preferable if backwashing of the membrane modules 20 is also performed on the membrane modules in turn such that backwashing of a membrane module 20 occurs while the membrane module 20 is being aerated." Rabie et al., ¶ 74, lines 1-4. In one pilot study, Rabie et al. further teaches, "Each cycle involved 15 minutes of permeation through the membrane modules 20 and 15 seconds of backwashing. The 75 seconds of aeration was timed so that there was 30 seconds of aeration before the backpulse, aeration during the backpulse, and 30 seconds of aeration after the backpulse. The test suggests that if cycled aeration is timed to coincide for each manifold 251 with the backwashing of the associated membrane module 20, then about 12 membrane modules

20 could be serviced by a single air supply 242 as part of the cyclic aeration system 237." Rabie et al., ¶ 75, lines 7-17.

24. While the pilot study disclosed no aeration during permeation, Rabie et al. discloses that aeration at a low rate frequently occurs during permeation. Rabie et al., ¶ 75, lines 1-7. Specifically, at ¶ 48, Rabie et al. teaches, "For feed waters in which the rate of fouling is not significant enough to require a positive lower rate of air flow, Rl may still be made positive for other reasons. With some aerators or air delivery systems, a positive lower rate of air flow may be desired, for example, to prevent the aerators from becoming flooded with tank water 18 at the lower rate of air flow. While periodic flooding is beneficial in some aerator designs, in others it causes unwanted foulants to accumulate inside the aerator. A positive lower rate of air flow may also be used because of leaks in the valves of the valve set 254 or to reduce stresses on the valve set 254 for the air delivery network 240. Regarding leaks, the lower rate of air flow may typically be as much as about 10%, but preferably about 5% or less, of the higher rate of air flow without significantly detracting from the performance achieved with a completely air off condition. Continuing to use valves (which are typically butterfly valves) even after they have developed small leaks decreases the operating expense of the cyclic aeration system 237. Regarding stresses on the valves in the valve set 254 or the air delivery network 240, such stresses can be reduced by purposely not closing the valves entirely. As in the cases of leaks, the lower rate of air flow may be as much as about 10%, but preferably about 5% or less, of the higher rate of air flow typically without significantly detracting from the performance achieved with a completely air off condition."

25. To recap, Rabie et al. discloses one or more membrane groups (Fig. 5, membranes modules 20) being provided air flow (air blower 242, valve set 254, air delivery system 240) between the aeration cycles [claim 18] where the time (15 minutes) between aeration cycles is at least as long as the time (7.5 minutes) during aeration cycles [claim 19].

26. In summary, Rabie et al. anticipates dependent claims 12-16, 18, and 19.

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise R. Anderson whose telephone number is (571)270-3166. The examiner can normally be reached on Monday through Thursday, from 8:00 am to 6:00 pm.

28. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

29. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DRA

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797